

REMARKS

I. Introduction

Applicants express appreciation for Examiner McDonald's courtesy and professionalism in conducting a telephonic interview on December 9, 2004, agreeing that the drawings as originally filed are acceptable. In response to the Office Action dated September 24, 2004, Applicants have canceled claims 7 through 9, without prejudice or disclaimer. Also, Applicants have amended claims 1 and 4 so as to further clarify the claimed subject matter. Support for these amendments can be found, for example, in Fig. 3 and its corresponding section of the specification. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-9 Under 35 U.S.C. § 102

Claims 1-7 are rejected under 35 U.S.C. § 102 as being anticipated by USP No. 6,315,857 to Cheng. Applicants respectfully traverse this rejection for at least the following reasons.

Claim 1

Claim 1 recites in-part a method for polishing a semiconductor wafer, in which the semiconductor wafer is polished by continuously driving a surface plate on which a plurality of polishing pads are stuck, the surface of each of the polishing pads being provided with a plurality of grooves each extending linearly in the drive direction of the pad, wherein in the sticking step, the polishing pads are stuck in such a manner that the grooves of each polishing pad are spaced not to

align with the grooves of the polishing pad adjacently arranged in the drive direction of the surface plate, as is shown, for example, in Fig. 1(b).

Referring to Fig. 1(b), in accordance with one exemplary embodiment of the present invention, the polishing pads 12 adjacently arranged in the drive direction of the surface plate 11 are disposed in such a manner that the grooves 12a of one polishing pad 12 extending linearly in the drive direction do not align with the grooves of another adjacent polishing pad. In this manner, the grooves provided in one polishing pad are offset from the grooves provided in another polishing pad, so that substantially the entire work surface of the semiconductor wafer 20 comes into contact with at least one of the polishing surfaces of the polishing pads, even though the semiconductor wafer 20 is rotating.

Turning to the cited prior art, Cheng discloses providing a belt-type polishing pad having a horizontal pattern in which a plurality of grooves extend **in parallel to each other diagonally with respect to the direction of travel of the belt** (see, Figs. 3a and 3b and col. 3, lines 55-63), a belt-type polishing pad having a **cross-hatched or diamond pattern** in which the grooves extend **diagonally with respect to the direction of travel of the belt** (see, Figs. 3c and 3d and col. 4, lines 5-13), a belt-type polishing pad having a zig-zag pattern in which the grooves extend in **zig-zag or saw-tooth direction with respect to the direction of travel of the belt** (see, Fig. 4a and col. 4, lines 22-25), and a belt-type polishing pad having a sinusoidal pattern in which the grooves extend **in a wavy shape with respect to the direction of travel of the belt** (see, Fig. 4b and col. 4, line 26). However, Cheng appears silent with regard to providing polishing pads having a plurality of grooves, where the polishing pads are positioned such that the grooves of a given polishing pad do not align with the grooves of another adjacent polishing pad. Also, Cheng does not disclose or

suggest providing a plurality of grooves which extend linearly with respect to the drive direction of the polishing pad.

For at least these reasons, Cheng does not disclose or suggest a method for polishing a semiconductor wafer, in which the semiconductor wafer is polished by continuously driving a surface plate on which a plurality of polishing pads are disposed, the surface of each of the polishing pads being provided with a plurality of grooves each extending linearly in the drive direction of the pad, wherein in the sticking step, the polishing pads are stuck in such a manner that the grooves of each said polishing pad do not align with the grooves of the adjacent polishing pad in the drive direction of the surface plate, as recited by claim 1.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Cheng fails to disclose or suggest the foregoing claim elements, it is clear that Cheng does not anticipate claim 1 or any of the claims dependent thereon.

Claim 4

Claim 4 recites in-part a polishing pad for a semiconductor wafer, wherein a plurality of grooves extending linearly in the drive direction of the polishing pad are formed over the entire width from edge to edge of the polishing pad in the direction perpendicular to the drive direction.

In accordance with one exemplary embodiment of the present invention, a plurality of grooves extending linearly in the drive direction of the polishing pad are formed over the entire width of the polishing pad in the direction perpendicular to the drive direction. Specifically, as shown in Fig. 3 of Applicants' drawings, the grooves 12a extend linearly in the drive direction, and

are provided over the entire width of the polishing surface in the direction perpendicular to the drive direction of the polishing pad. As a result, the present invention advantageously provides a solution to the problem in which the edge of the work surface of the semiconductor wafer is polished more deeply than the surrounding surface, and a desired surface flatness is obtained accordingly.

In contrast, for at least the reasons discussed above, Cheng discloses providing a belt-type polishing pad having a horizontal pattern in which a plurality of grooves extend **in parallel to each other diagonally with respect to the direction of travel of the belt** (see, Figs. 3a and 3b and col. 3, lines 55-63), a belt-type polishing pad having a **cross-hatched or diamond pattern** in which the grooves extend **diagonally with respect to the direction of travel of the belt** (see, Figs. 3c and 3d and col. 4, lines 5-13), a belt-type polishing pad having a zig-zag pattern in which the grooves extend in **zig-zag or saw-tooth direction with respect to the direction of travel of the belt** (see, Fig. 4a and col. 4, lines 22-25), and a belt-type polishing pad having a sinusoidal pattern in which the grooves extend **in a wavy shape with respect to the direction of travel of the belt** (see, Fig. 4b and col. 4, line 26). However, Cheng appears silent with regard to providing a plurality of grooves which extend linearly with respect to the drive direction of the polishing pad. Thus, Cheng does not disclose or suggest forming the grooves extending **linearly** with respect to the direction of travel of the polishing pad, or which are formed over the entire width from edge to edge of the polishing pad in the direction perpendicular to the drive direction.

Hence, at a minimum, Cheng does not disclose or suggest a polishing pad for a semiconductor wafer, wherein a plurality of grooves extending linearly in the drive direction of the polishing pad are formed over the entire width from edge to edge of the polishing pad in the direction perpendicular to the drive direction, as recited by claim 4.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Cheng fails to disclose or suggest the foregoing claim elements, it is clear that Cheng does not anticipate claim 4 or any of the claims dependent thereon.

III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claims 1 and 4 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

For all of the foregoing reasons, it is submitted that dependent claims 2-3 and 5-6 are patentable over the cited prior art. Accordingly, it is respectfully submitted that the rejections of claims 1-6 under 35 U.S.C. § 102 have been overcome.

IV. Conclusion

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

Application No.: 10/665,015

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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